UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/653,516	09/02/2003	Peter W. Robinson	101856-201	3878

27267 7590 11/29/2005

WIGGIN AND DANA LLP
ATTENTION: PATENT DOCKETING
ONE CENTURY TOWER, P.O. BOX 1832
NEW HAVEN, CT 06508-1832

EXAMINER	
BERGIN, JAMES S	
ART UNIT	**PAPER NUMBER**
3641	

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/653,516	ROBINSON ET AL.	
	Examiner	Art Unit	
	James S. Bergin	3641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-22* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/2/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. This application contains claims directed to the following patentably distinct species of the claimed invention:

Species A, the method of manufacturing a frangible slug having a composition that consists essentially of 35% ferrotungsten, 3% lubricant, the balance iron and inevitable impurities (claims 1 and 18);

Species B, the method of manufacturing a frangible slug having a composition that consists essentially of metallic powder and lubricant, wherein the metallic powder is oxide-reduced iron (claim 20).

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claim 16 appears to be generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims

are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

2. A telephone call was made to Timothy J. Olsen on 11/21/2005 to request an oral election to the above restriction requirement, but did not result in an election being made. Mr. Olsen could not be contacted and the examiner left a voicemail message explaining the requirement.

Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 4-6, 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 4, the limitation, *"effective to increase the density of the slug to 30 percent ferrotungsten"* is not understood because the composition has already been claimed as consisting essentially of up to 35 percent ferrotungsten in claim 1. Is the applicant attempting to claim the slug as consisting essentially of 30 percent ferrotungsten?

In claim 12, line 2, "theol" is not understood.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 16, 21 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Mravic et al. (US 5,399,187 A; hereinafter "Mravic").

Regarding claim 16, Mravic discloses a method of forming a lead-free projectile consisting essentially of metallic powder and a lubricant (col. 2, lines 18-62; col. 4, lines 18-36) compacting the mixture and sintering at a temperature between 180 and 900

degrees C (col. 6, lines 6-36). Mravic's projectile is inherently capable of being fired from a ballistic tool.

Regarding claim 21, Mravic discloses compacting at a pressure of 100,000 psi (col. 6, lines 12-13).

Regarding claim 22, Mravic discloses disposing an integrally bonded sleeve, in the form or a jacket or coat, on the projectile so as to protect the gun barrel from damage during firing (col. 5, lines 28-40). The integrally bonded sleeve of Mravic's projectile would inherently engage the rifling of the gun barrel.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mravic et al. (US 5,399,187 A; hereinafter "Mravic").

Regarding claim 20, although Mravic discloses that the powdered metal can comprise iron (col. 6, lines 5-12), Mravic does not specifically disclose that the iron is oxide-reduced iron. However, the applicant admits to the commercial availability of oxide-reduced iron on pages 9 and 10 of the specification. This section of the applicants' specification admits that oxide-reduced iron has a dendritic or sponge-like morphology and mentions that the properties of such oxide-reduced iron are described

in the publication "*Ancorsteel 1000, 1000B, 1000C Atomized Steel Powders For High Performance Powder in Metallurgy Applications", April, 1990*, which applicants' have incorporated by reference in its entirety.

In view of applicants' admission of the commercial availability of oxide-reduced iron and its advantages as a high performance powder in metallurgy applications, it would have been obvious to one of ordinary skill in the art at the time that the invention was made, to select oxide-reduced iron powder as the iron powder in Mravic's projectile, and so avail of its high performance powder properties in a metallurgy application.

10. Claims 1-14, 17, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mravic et al. (US 5,399,187 A; hereinafter "Mravic") in view of Lowden et al. (US 5,760,331 A; hereinafter "Lowden").

Regarding claims 1, 3, 4 and 11 (and in as much as claim 4 can be understood due to its indefiniteness), Mravic discloses a method of forming a lead-free projectile consisting essentially of metallic powder mixture of powdered ferrotungsten, powdered iron, and a lubricant (col. 2, lines 18-62; col. 4, lines 18-36), compacting the mixture and sintering at a temperature between 180 and 900 degrees C for 2 hours (col. 6, lines 6-36). Mravic's projectile is inherently capable of being fired from a ballistic tool. Mravic does not specifically disclose the precise percentages of the projectiles constituent materials, except to say that the proportions of the metal powders are such that they would have the density of lead if there were no porosity after sintering. Lowden discloses a sintered lead-free projectile, the frangibility of the projectile being

determined at least by controlling the ratio of its constituent materials (col. 6, lines 27-50).

In view of Lowden, it would have been obvious to one of ordinary skill in the art at the time that the invention was made to control the frangibility of Mravic's projectile by controlling the ratio of its constituent materials. It would further have been obvious to one having ordinary skill in the art at the time the invention was made to select up to 35% ferrotungsten, up to 3% lubricant, the balance being iron, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 2, Mravic discloses compacting at a pressure of 100,000 psi (col. 6, lines 12-13).

Regarding claims 5-8, Mravic does not disclose the particle size of the ferrotungsten or iron powders. Lowden discloses that the particle size selected will influence the frangibility of a sintered lead-free projectile (col. 6, lines 27-50) and so influence the porosity and fracture toughness of the projectile. In view of Lowden, it would have been obvious to one of ordinary skill in the art at the time that the invention was made to vary the frangibility of Mravic's projectile by selecting the particle size of the powdered metals so as to produce a projectile with any desired porosity and fracture toughness. It would further have been obvious to one of ordinary skill in the art at the time that the invention was made to select the claimed metal particle size ranges of the applicants' claims 5-8, since it has been held that where the general conditions of a

claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claims 9 and 10, Mravic discloses that the powders are compacted using pressures of 100,000 psi (col. 6, lines 11-15) but does not specifically state that the compact has transverse rupture strength in excess of 800 psi or 1050 psi. However, given Mravic's disclosed 100,000 psi compressing pressure, the transverse rupture strength of Mravic's compact is inherently in excess of 800 psi or 1050 psi. In support of this inherency it is noted that the applicants' compacting is performed at a pressure of between about 20,000 psi and about 120,000 psi to produce a compact with a transverse rupture pressure of between 800 psi and 1050 psi.

Regarding claim 13, Mravic discloses disposing an integrally bonded sleeve, in the form or a jacket or coat, on the projectile so as to protect the gun barrel from damage during firing (col. 5, lines 28-40). The integrally bonded sleeve of Mravic's projectile would inherently engage the rifling of the gun barrel.

Regarding claim 14, Mavric's projectile can be lubricant free (col. 2, lines 41-45) or is inherently essentially lubricant free after the sintering process (applicants' admit that the sintering process removes the lubricant (see specification page 9, lines 3-4)

Regarding claim 17, Mravic discloses a method of forming a lead-free projectile as discussed above. Regarding claim 17, Mravic discloses that the metallic powder mixture comprises iron (col. 6, lines 5-12), and that the proportions of the metal powders are such that they would have the density of lead if there were no porosity after sintering. However, Mravic does not specifically disclose that the metallic powder has

an overall iron content of at least 65%. Lowden discloses a sintered lead-free projectile, the frangibility of the projectile being determined at least by controlling the ratio of its constituent materials (col. 6, lines 27-50).

In view of Lowden, it would have been obvious to one of ordinary skill in the art at the time that the invention was made to control the frangibility of Mravic's projectile by controlling the ratio of its constituent materials. It would further have been obvious to one having ordinary skill in the art at the time the invention was made to select an overall iron content of at least 65%, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 18, Mravic discloses a method of forming a lead-free projectile as discussed above with regard to claim 1. Mravic discloses that the powders are compacted using pressures of 100,000 psi (col. 6, lines 11-15) but does not specifically state that the compact has a transverse rupture strength in excess of 800 psi. However, given the disclosed 100,000 psi compressing pressure, the transverse rupture strength of Mravic's compact is inherently in excess of 800 psi.

Regarding claims 12 and 19, Mravic discloses that the frangibility of the projectile can be controlled by suitably varying the sintering time and/ or the sintering temperature (col. 5, lines 5-9). Lowden discloses controlling the frangibility of a sintered lead-free projectile (col. 6, lines 27-50) so as to produce a projectile with desired fracture toughness or other physical property. In view of Lowden, it would have been obvious to one of ordinary skill in the art at the time that the invention was made to vary the

frangibility of Mravic's projectile by choice of materials, consolidation technique, particle size etc. so as to produce a projectile with any desired fracture toughness, including a projectile frangibility that would result in a fragment pattern such as that recited in claims 12 and 19.

11. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mravic et al. (US 5,399,187 A; hereinafter "Mravic") in view of Lowden et al. (US 5,760,331 A; hereinafter "Lowden") as applied to claim1 above, and further in view of Harris et al. (US 6,038,978 A) or Dippold et al. (US 5,824,944).

Mravic does not specifically disclose that the lead-free projectile is dimensioned to be expelled from an eight-gauge industrial tool. However, Harris et al. discloses a projectile sized for use with an eight-gauge industrial tool (col. 2, lines 40-45). Dippold et al. discloses a lead free projectile sized for use with an eight-gauge industrial tool. In view or either Harris et al or Dippold et al., it would have been obvious to one of ordinary skill in the art at the time that the invention was made to size Mravic's projectile for use with an eight-gauge industrial tool, because to do so would only involve the dimensioning a projectile for use in a ubiquitously well known caliber of industrial tool at the time that the invention was made.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Stone (US 6,892,647 B1); Stone (US 2002/0005137 A1); Mravic et al. (US 6,158,351 A).

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Bergin whose telephone number is 571-272-6872. The examiner can normally be reached on Monday - Wednesday and Friday, 8.30 - 5.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 571-272-6873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

J. S. Bergin

MICHAEL J. CARONE
SUPERVISORY PATENT EXAMINER